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Positive cognitive behavior therapy in the treatment of depression: A randomized order within-subject comparison with traditional cognitive behavior therapy

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ABSTRACT

Previous research suggests that a stronger focus on positive emotions and positive mental health may improve efficacy of Cognitive Behavior Therapy (CBT). Objectives were to compare differential improvement of depressive symptoms (primary outcome), positive affect, and positive mental health indices during positive CBT (P-CBT; CBT in a solution-focused framework, amplified with optional positive psychology exercises) versus traditional, problem-focused CBT (T-CBT). Forty-nine patients with major depressive disorder (recruited in an outpatient mental health care facility specialized in mood disorders) received two treatment blocks of eight sessions each (cross-over design, order randomized). Intention-To-Treat mixed regression modelling indicated that depressive symptoms improved similarly during the first, but significantly more in P-CBT compared to T-CBT during the second treatment block. Rate of improvement on the less-frequently measured secondary outcomes was not significantly different. However, P-CBT was associated with significantly higher rates of clinically significant or reliable change for depression, negative affect, and happiness. Effect sizes for the combined treatment were large (pre-post Cohen's d = 2.71 for participants ending with P-CBT, and 1.85 for participants ending with T-CBT). Positive affect, optimism, subjective happiness and mental health reached normative population averages after treatment. Overall, findings suggest that explicitly focusing on positive emotions efficiently counters depressive symptoms.

1. Introduction

Cognitive behavior therapy (CBT) is the most well-researched evidence-based psychotherapeutic treatment for major depressive disorder (MDD). CBT is a structured, time-limited, and problem-focused form of psychotherapy for major depressive disorder targeting disorder-maintaining behavior as well as cognitions. Response and remission rates are around 60% and 30%, respectively, which is superior to waitlist or placebo conditions and comparable to rates of other evidence-based psychotherapies and antidepressant medication (Cuijpers et al., 2013). Moreover, CBT may have favorable long-term effects regarding rates of relapse in comparison to treatment with anti-depressant medication (Bockting, Hollon, Jarrett, Kuyken, & Dobson, 2015; Zhang, Zhang, Zhang, Jin, & Zheng, 2018). However, these findings indicate that there is ample room for improvement of efficacy. One of the ways to increase efficacy of CBT is a more explicit and systematic focus on positive emotions and positive mental health. The following three arguments outline why this may have the potential to improve CBT.

First, CBT for MDD is aimed mainly at clinical response or remission. From a patient perspective, achieving a maximum decrease of depressive symptomatology entails a too narrow definition of successful treatment (Demyttenaere et al., 2015; Zimmerman et al., 2012, 2013). The reduction or absence of depressive symptoms does not automatically translate into increased well-being (Keyes, 2002). It leaves an increase in positive mental health, characterized by features such as optimism, a general sense of well-being, and a return to usual or even better than premorbid levels of functioning, unaddressed (Zimmerman et al., 2006). Broadening the focus of CBT for MDD by including themes

Abbreviations: P-CBT, Positive cognitive behavior therapy; T-CBT, Traditional cognitive behavior therapy

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such as optimism, strengths, meaning and life-goals may therefore do more justice to patient expectations, as well as make patients' lives more fulfilled and resilient.

Second, within the traditional framework of CBT there is a relative neglect of the experience and enhancement of positive emotions, which is typically decreased in depressed subjects (Watson & Naragon-Gainey, 2010). An increase in positive emotions has repeatedly been shown to be more important than a decrease in negative emotions when it comes to well-being, and the prevention of, and recovery from depression (Geschwind et al., 2011, 2010; Höhn et al., 2013; Khazanov & Ruscio, 2016). Accordingly, recent reviews concluded that, in addition to the reduction of negative emotions, the promotion of positive emotions should be a main focus in the treatment of depression (Craske, Meuret, Ritz, Treanor, & Dour, 2016; Dunn, 2012).

Third, even healthy people pay more attention to negative events than positive events (a phenomenon known as negativity bias) (Baumeister et al., 2001). In people with depression such a bias is even more prominent (Gotlib, Krasnoperova, Yue, & Joormann, 2004; Kircanski & Gotlib, 2015; Koster, De Raedt, Leyman, & De Lissnyder, 2010). CBT may inadvertently reinforce an already present negativity bias by asking patients to register weaknesses and problematic instances and by elaborating on this during and outside the sessions.

Two strategies may be used simultaneously to enhance a more explicit and systematic focus on positive emotions and positive mental health within a CBT framework. A first strategy is to change the content of CBT through integration with solution-focused brief therapy, such that the content of therapy is aimed at structurally and persistently reinforcing attention to positive features, both during sessions as well as in homework exercises (Bannink, 2012, 2017; Padesky & Mooney, 2012; De Shazer, Dolan, Konnan, & Berg, 2012). A second strategy is to address themes such as optimism and well-being explicitly during treatment, for example through integrating traditional CBT protocols with positive psychology interventions (Johnson & Wood, 2017). We will now describe both strategies in more detail.

Solution-focused brief therapy focuses on the preferred future of the patient and identifies what works for a patient. Therapist and patient and are co-experts (Bannink, 2012; De Shazer et al., 2012). Solution-focused brief therapy is characterized by orientation towards positive features and successes, by stimulating patients to elaborate on behavior and cognitions during better moments (looking at exceptions to problems rather than looking at problems), and by encouraging transfer of successful strategies in problematic situations. Evidence from more fundamental research on neural networks and habit formation suggests that persistent reinforcement of orientation to positive features, rather than negative or neutral features, might stimulate the development of alternative, positive information processing habits more optimally (Berkman, 2018; Eguchi et al., 2017; Verplanken, 2010; Wood & Neal, 2007). Shifting attention towards the positive in CBT may thus be an underused aid when it comes to stimulating positive emotions as well as challenging the pervasive negativity biases which characterize MDD.

Regarding integration with positive psychology, to date, evidence suggests that positive psychology interventions have modest effects on well-being and depressive symptomatology. Earlier meta-analyses (Bolier et al., 2013; Sin & Lyubomirsky, 2009), based on studies in predominantly non-clinical populations, showed small significant effect sizes of positive psychology interventions on well-being ($r = 0.29$, $d = 0.20$) and depressive symptoms ($r = 0.31$, $d = 0.23$). A recent meta-analysis in clinical samples (Chakhssi, Kraiss, Sommers-Spijkerman, & Bohlmeijer, 2018) again reported small but significant effect sizes for well-being ($g = 0.28$) and depression ($g = 0.27$). However, after removal of low-quality studies these effect sizes decreased to a significant effect size ($g = 0.19$) for well-being, but a non-significant effect size for depression ($g = 0.07$). Given that many studies suffered from shortcomings in allocation procedures, assessment outcome, drop-out description, insufficient power, and an absence of intention-to-treat analysis, the authors classified the quality of included studies as low to medium, and called for improvement of research methodology of PPIs for psychiatric disorders (Chakhssi et al., 2018). Taken together, these meta-analyses thus suggest that integrating CBT with positive psychology exercises may be useful.

Some may think of Fava's well-being therapy (Fava & Tomba, 2009) at this point, because it integrates traditional CBT elements with findings and interventions from positive psychology. However, well-being therapy was originally designed as a treatment for residual symptoms after the primary diagnosis has been addressed (i.e., not as an acute treatment; Fava, Cosci, Guidi, & Tomba, 2017). Moreover, well-being therapy largely focuses on analyzing and repairing problems, with the goal of *removing cognitive and behavioral obstacles* to well-being (rather than building well-being bottom-up; Bannink & Jansen, 2017; Fava et al., 2017). For example, in the intermediate sessions of well-being therapy, therapist and client focus on monitoring and identifying thoughts, beliefs and behaviors that lead to premature interruption of well-being (Fava, 2016; Fava & Tomba, 2009). Well-being therapy therefore does not use the strategy of structural and persistent reinforcement attention to positive features in therapy sessions and homework. Recently, Bannink introduced positive CBT (P-CBT; Bannink, 2012, 2017). By blending CBT with (i) a persistent focus on positive features, as well as (ii) positive psychology interventions (see section 'intervention'), P-CBT uses both strategies to create a strong focus on positive emotions and positive mental health.

Against this background of previous work, the aim of our study was to examine the efficacy of positive CBT as an alternative to traditional CBT (T-CBT) for the treatment of MDD, and to compare both forms of CBT with regard to their short-term effects on depressive symptoms and positive mental health. We aimed at recruiting actively help-seeking patients who had been referred to an outpatient treatment facility specialized in depressive disorders and thus had moderate to severe, rather than subthreshold or mild, complaints. Because willingness to participate in clinical research is low for these populations in routine health care settings in the Netherlands, we opted for a crossover within-subjects design in order to make most efficient use of this limited resource. A within-subject design significantly reduces noise and hence the number of participants needed in terms of power but comes with the risk of carry-over or order effects. Within treatments, we alternated P-CBT and T-CBT in two blocks of 8 sessions each (with the order of blocks counterbalanced and randomized). We investigated whether improvement of depressive symptoms and negative affect differs between P-CBT and T-CBT, and whether P-CBT would be accompanied by greater improvements in positive affect and other indices of positive mental health (optimism, subjective happiness), compared to T-CBT. Lastly, given the necessity of checking for possible qualifying effects inherent to our crossover design, we explored which order of application of T-CBT and P-CBT would be optimal if one were to use P-CBT as an add-on to T-CBT (even though P-CBT has originally been conceptualized as a stand-alone alternative to T-CBT; Bannink, 2012, 2017).

2. Method

2.1. Design

In a within-subject experimental crossover design, T-CBT was alternated with P-CBT in two blocks of eight sessions each (with the order of blocks counterbalanced and randomized for men and women separately). Immediately after each session, participants completed the 16-item Quick Inventory of Depressive Symptoms, which was the main outcome measure (QIDS; Trivedi et al., 2004). At baseline and after every four sessions, participants additionally completed a battery of more extensive questionnaires online from home, see measures.

2.2. Power calculation

For this within-subjects-design, power calculations indicated a required sample size of 34 participants with complete data in order to detect a medium sized effect on our main outcome measure ($f = 0.25$ or $d = 0.5$, $\alpha = 0.05$) with 80% power (calculated with G*Power; Faul, Erdfelder, Buchner, & Lang, 2009). This power calculation was based on a within-subject comparison of the slopes of the (weekly measured) primary outcome measure between the two different treatment blocks (P-CBT vs. T-CBT). Note that this is neither a pilot study nor a test of add-on therapy but a comparison of the intensity of improvement related to the different approaches within participants' treatment. Powering the study for between-subject comparisons (such as differences between participants during the first phase of treatment) was unattainable in this clinical treatment setting with severely depressed patients, and also the less frequently completed measures are likely to be underpowered.

2.3. Participants

After a diagnostic work-up including Structured Clinical interviews for DSM-IV disorders (SCID-I), subjects fulfilling criteria for a current episode of MDD (DSM-IV) were informed about the project and asked to participate. DSM-IV criteria were used because data collection started in 2015. DSM-5 was then not yet employed in the routine mental health care setting in which we recruited participants and executed our study. Inclusion criteria were major depressive disorder as their primary axis-1 disorder, lasting no longer than two years (not chronic), and fluency in the Dutch language. Use of antidepressant medication was allowed, as long as the medication was kept stable from minimally one month before and during the psychotherapy trial. If participants changed antidepressant medication during the trial, their data were analyzed until the moment of dropout. Exclusion criteria were bipolar disorder, borderline personality disorder, severe alcohol or drug abuse or addiction, or suspected IQ lower than 80. IQ was not assessed formally. A suspicion of low IQ was either based on previous health care reports or on the clinician's impression during the intake assessment, in combination with very low education level (education level is a rough indicator of IQ in the Netherlands; research indicates correlations between educational level and IQ in the 0.50 - 0.85 range; Deary, Strand, Smith, & Fernandes, 2007; Gerritsen, Berg, & Deelman, 2001; Luteijn & Barelds, 2004; Plassman et al., 1995; Tambs, Sundet, Magnus, & Berg, 1989; Wechsler, 2005). Fig. 1 shows the participant flow from screening to analysis. Based on these criteria, all consecutively referred patients of the mood disorders unit of a specialized mental health care centre were screened for potential participation. Some eligible patients participated in a concurrently running RCT, restricting enrollment into the current study, so that of the 416 patients reviewed, only 49 were randomized into the current study. Data were collected between February 2015 and February 2018. Recruitment ended when we were confident to have at least 34 complete sets of data.

2.4. Intervention

Participants received 16 sessions of CBT for their major depressive disorder. In order to disentangle the effects of the different treatment approaches, sessions were organized in two blocks of eight sessions each, and the starting order of the two blocks was randomized. In one block, therapists provided Bannink's model of P-CBT (2012, 2017). In the other block, therapists provided T-CBT for depression as described in standard protocols based on Beck's cognitive and Lewinsohn's behavioral model (Beck, Rush, Shaw, & Emergy, 1979; Lewinsohn, Munoz, Youngren, & Zeiss, 1986).

P-CBT is transdiagnostic and consists of three ingredients: (1) the structure of CBT (e.g., clear session structure, homework, self-monitoring and functional analyses (of better moments instead of the problem), upward (instead of downward) arrow technique), is blended with (2) the content and language of solution-focused brief therapy (e.g., patient as co-expert, focus on the patient's preferred future and better moments; De Shazer et al., 2012), and amplified with (3) positive psychology exercises (e.g., three blessings, optimistic attribution; Seligman, 2006; Sin & Lyubomirsky, 2009). In P-CBT, the therapist focuses on exceptions to problems, strengths of the patient, and progress towards goals. All subsequent sessions in the P-CBT block started with the question "What is better?", followed by exploration of the individual's contribution to these better moments and positive consequences of these better moments. P-CBT homework always included participants paying attention to and registering better moments and their own contribution to these better moments. Positive psychology exercises were offered during sessions and as homework. Examples of positive psychology exercises used in P-CBT are writing about and visualizing Your Best Possible Self (King, 2001), making a Gratitude Visit (Lyubomirski, 2008), the Three Blessings Exercise (Seligman, Steen, & Peterson, 2005), or practicing optimistic attribution (Seligman, 2006). For a more extensive description of P-CBT, we refer to Bannink (2012; 2017).

T-CBT sessions followed the standard CBT approach and contained both behavioral activation elements (based on patients' mood and activity registrations) as well as cognitive elements and a relapse-prevention plan (Beck et al., 1979), with session structure and procedures as described in up-to-date treatment manuals (Bockting & Huibers, 2011; Strunk, Adler, & Hollon, 2016). Cognitive elements included socratic dialog on dysfunctional thoughts during moments when the mood dropped (based on clients homework records), and identification of more rational and helpful thoughts. Therapists could adjust the relative ratio of behavioral and cognitive elements per patient, as long as at least three sessions were spent on each element. Therapists were encouraged to express empathy and build a good working relationship with the patient, just as they would usually do. However, in order to avoid contamination between approaches, therapists were instructed to refrain from positive psychology exercises, explicitly solution-focused elements, and P-CBT components such as the upward arrow technique or the opening question "What is better?" (and ask instead how patients' mood has been during the last week).

Therapists worked at an outpatient mental health care unit specialized in mood disorders in the Netherlands. All therapists had completed at least a basic training in (traditional) CBT as part of their postgraduate education, were used to providing protocol-based (traditional) CBT interventions in routine clinical practice, and received regular biweekly supervision or intervision in T-CBT. Therapists' experience ranged between 2 and 18 years at the start of the trial. In order to minimalize therapist effects, all therapists provided both parts of the therapy. For P-CBT, with which therapists had no experience up to then, therapists followed a 2-day workshop led by Fredrike Bannink, and received biweekly to monthly supervision, also by Bannink.

2.5. Procedure

The study was registered in the Nederlands Trial Register (registration NTR4969). All study procedures were approved by the Ethics Committee of Maastricht University, Faculty of Psychology (reference ECP-132 01_09_2013), and all participants signed an informed consent form. Patients fulfilling the in- and exclusion criteria were informed about the project during the diagnostic work-up and asked to participate if they fulfilled the in- and exclusion criteria. Once a participant was assigned to a therapist, a research assistant made an individual appointment with participants during which they completed the baseline battery of questionnaires (duration approximately 1 h). During this meeting, the research assistant also checked sociodemographic details and explained the procedure related to the future online administration of the questionnaires.

After completion of baseline questionnaires, a research assistant

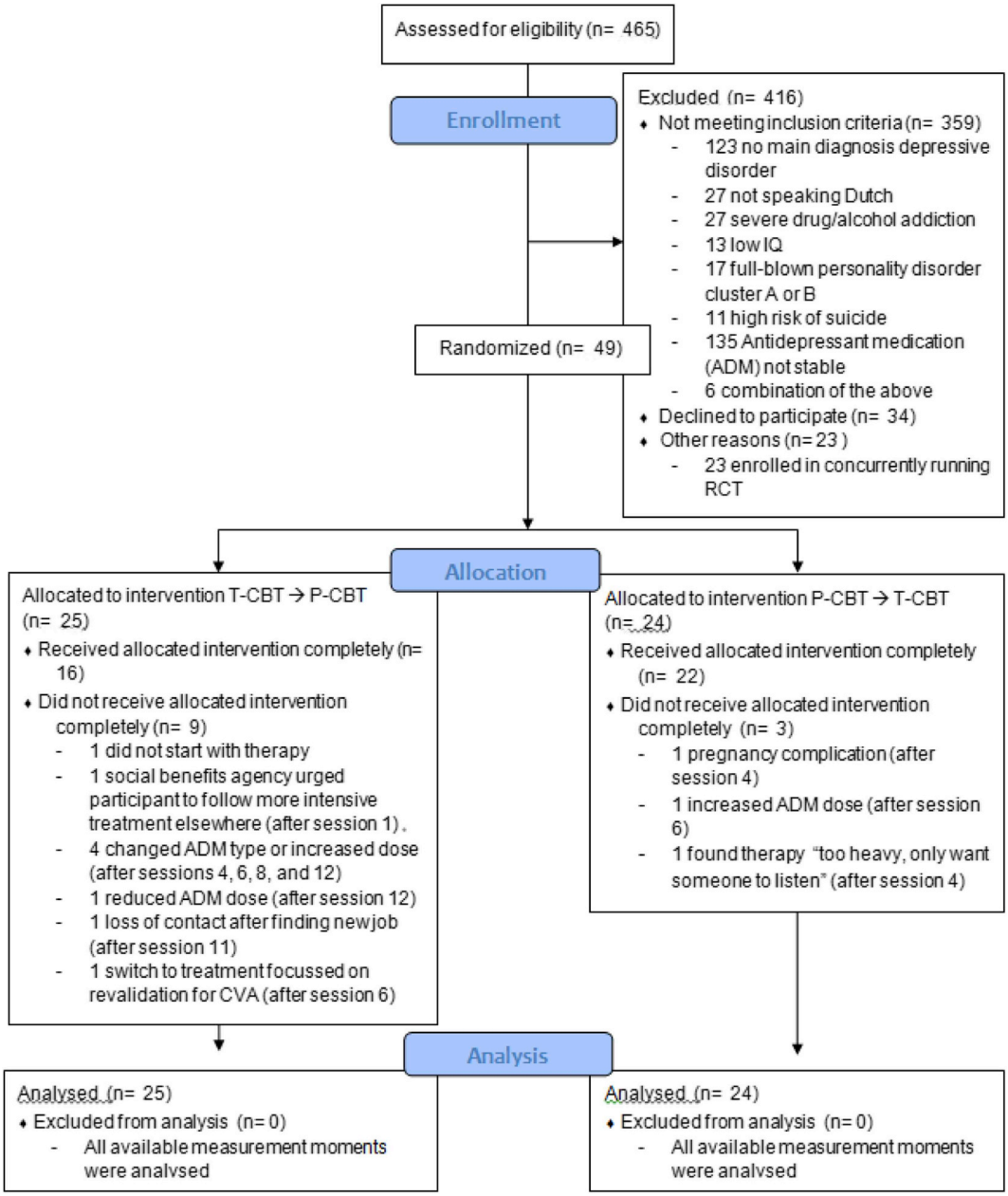

Fig. 1. Participant flow.

randomly allocated participants to one of the two treatment orders, stratified by gender. The random allocation sequence was generated by the first author, using random.org (allocation ratio 1:1, using a block size of four to ensure approximately equal participant numbers for both orders).

After completion of the baseline assessments, a research assistant informed the therapist about the order of treatment blocks. The therapist received two separate workbooks for each participant, one for each block. Sessions lasted 50 min. After each session, the client completed the QIDS online.

Research assistants prompted participants to complete the full battery of questionnaires online after every fourth session (thus after sessions four, eight, twelve, and sixteen; see Fig. 2). Completion of the online questionnaires took approximately 30–45 min per time. Participants received 5 EUR for each completed measurement, with a bonus of 10 EUR if all five measurements were complete.

2.6. Measures

2.6.1. Depressive symptoms

The *Quick Inventory of Depressive Symptoms* (QIDS-SR-16; primary outcome measure) is a popular 16-item self-report measure of DSM-5 depressive symptoms with established validity and reliability, and good internal consistency (Trivedi et al., 2004). Items are measured on a scale of 0–3. The total score is obtained by adding the highest scoring item scores for each of the nine symptom domains of the MDD criteria. Total scores range from 0 to 27, which scores below 6 indicating absence of depression, and scores above 15 indicating severe depression (Rush et al., 2003; Trivedi et al., 2004).

The *Remission from Depression Questionnaire* (RDS; Zimmerman et al., 2013) consists of 41 items scored 0–2 and captures a broader array of domains considered by patients to be relevant to the construct of remission from depression, including coping abilities, positive mental health and functioning. A total score is obtained by summing up item scores after reverse scoring items indicative of psychopathology. Lower

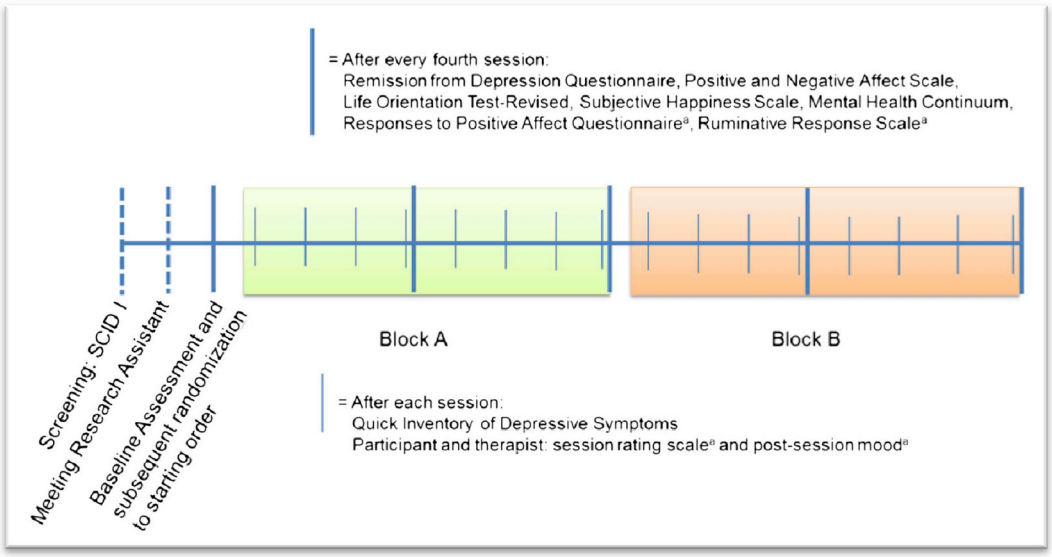

Fig. 2. Trial timeline and overview of measures. [a] will be reported in a subsequent publication.

total scores thus reflect better functioning. Strong features of the RDS include its high test-retest reliability, excellent internal consistency, and superior prediction of remission according to clients' own definition, compared to conventional depression questionnaires (Zimmerman et al., 2013).

2.6.2. Affect

The *Positive and Negative Affect Schedule* (PANAS; Watson, Clark, & Tellegen, 1988) was used to measure positive affect (PA) and negative affect (NA). The PANAS contains 10 positive affect items (PA; e.g., active, alert, attentive, excited) and 10 NA items (NA; e.g., afraid, distressed, ashamed, hostile) scored on a Likert scale ranging from 1 to 5. The PANAS is extensively validated and frequently used in research (Crawford et al., 2009; Crawford & Henry, 2004; Watson et al., 1988). Adding up the items scores per subscale results in scores for PA and NA.

2.6.3. Optimism

The *Life Orientation Test-Revised* (LOT-R; Scheier, Carver, & Bridges, 1994; Dutch translation: Meevissen, Peters, & Alberts, 2011) is a 10-item measure of optimism (including four filler items). Respondents rate items on a five-point Likert scale ranging from 0 (strongly disagree) to 4 (strongly agree). A total LOT-R score can be obtained by adding up the scores of the three positively phrased items and the reverse-scores of the three negatively phrased items such that higher scores reflect higher levels of optimism. Cronbach's alpha for the total scale is .75 (Scheier et al., 1994).

2.6.4. Overall happiness

Overall happiness was assessed using the four-item *Subjective Happiness Scale* (SHS; Lyubomirsky & Lepper, 1999). Items are rated on Likert Scales ranging from 1 to 7, which are averaged (after reverse-scoring one item) to form a total score. The SHS is a well-validated instrument and provides a global, subjective assessment of whether one is a happy or an unhappy person, both in absolute terms as well as relative to peers (a = 0.85).

2.6.5. Mental health

The *Mental Health Continuum-Short Form* (MHC-SF) is a 14-item self-report questionnaire covering three core components of well-being (emotional, psychological, and social wellbeing) scored on a scale of 0–5. The total of these three components (based on averaging all items) reflects positive mental health (Keyes, 2002). Analysis revealed good psychometric properties, and norm scores exist also for the Dutch version (Lamers, Westerhof, Bohlmeijer, ten Klooster, & Keyes, 2011).

2.7. Statistical analysis

2.7.1. Weekly QIDS-SR-16 ratings

The weekly QIDS-SR-16 ratings were analyzed with mixed regression (intention-to-treat analysis). A preliminary exploration indicated that the general time effect was best described by a log(time) model. For the repeated part, the model with AR1 covariance structure had the best fit. Log(time) was centered at session 9, as at that session the switch in treatment condition was made (the centered log time variable was defined as LN(session) – LN(9)), with session numbered from 1 up to 16). Random intercept and slope for centered log(time) were added to the random part with an unstructured covariance structure.

To test whether improvement in depressive symptoms differed between treatment conditions, centered log(time), and the interactions condition x centered log(time), phase (1st or 2nd) x centered log(time) and condition x phase x centered log(time) were entered as predictors in the fixed part. The condition x centered log(time) interaction tests whether improvement differs between P-CBT and T-CBT, the condition x phase x centered (log)time interaction tests whether that a difference in improvement between the two CBT forms depends on treatment phase (first or second). Inspection of residuals indicated the correctness of the assumption of their normal distribution, and repeating the analysis after leaving out outliers did not change the conclusions. By chance, there was a significant difference in number of participants with single vs. recurrent episodes between order groups (with more participants with single episode in the group starting with P-CBT, and more participants with repeated episodes in the group starting with T-CBT). To address this adequately, the interactions of the single vs. recurrent episodes variable with all effects involving time were added to the fixed part. Nonsignificant episode-related interactions were deleted in a backwards procedure, starting with the highest interactions. Conventional effect sizes in terms of Cohen's *d* were estimated based on the fixed effects for the numerator, and the SD of the baseline for the denominator.

2.7.2. Assessments with a four-session frequency

The five assessments with a four-session frequency (baseline, 4, 8, 12, 16 sessions) were analyzed with mixed regression (intention-to-treat analysis). For the repeated part, the best fitting covariance structure turned out to be AR1. The addition of random parts created estimation problems and was therefore not done.

To test whether improvement differed by condition, centered time (−2, −1, 0, 1, 2), and the interactions condition x centered time, phase x centered time and condition x phase x centered time were entered as predictors in the fixed part. The condition x centered time interaction tests the hypothesis that improvement differed between P-CBT and T-CBT, the condition x phase x centered time interaction tests the hypothesis that a difference in improvement between the two CBT forms depended on phase. Conventional effect sizes in terms of Cohen's *d* were estimated based on the fixed effects for the numerator, and the SD of the overall sample at baseline for the denominator.

To test whether *averages* during treatment differed by condition, pre-treatment baseline assessments were excluded, as they did not belong to either condition. Condition, phase, and condition by phase were entered as predictors in the fixed part. Residuals were checked for distribution and outliers. No problems were apparent.

2.7.3. Calculation of reliable change and clinically significant improvement

Upon reviewer request, we additionally calculated reliable change as well as clinically significant improvement, following Jacobson & Truax (1991). Per treatment order, we looked at the proportion of individuals showing reliable change (RC) and reliable and clinically significant improvement (RC + CSC) per treatment phase. Using the Leeds Reliable Change calculator (Morley & Dowzer, 2014), reliable change cut-offs were calculated based on the standard deviation of each measure at pre-assessment in the overall sample and Cronbach's alpha's for each scale taken from the original scale development papers. Clinically significant improvement cut-offs were calculated using criterion c (which uses clinical group values taken from the pre-treatment assessment in the current sample and normative comparison group values taken from relevant scale development papers to determine whether participants are closer to comparison group values than to their clinical mean. For the RDQ and the QIDS-SR-16, for which comparison group values were not available, we used criterion a (falling more than two standard deviations away from clinical group mean in the direction of clinical improvement). Separately for T-CBT and P-CBT, and per phase, we then calculated the number of times that an RC or an R + CSC had occurred (coded as 1 [improvement], 0 [no improvement]). Additionally, we examined to which extent positive mental health indices were comparable to normative samples, by calculating the proportion of participants in each arm scoring better than the normative means minus half a standard deviation provided in scale development papers.

In order to examine differences between phase and condition, we performed generalized linear mixed effects logistic regression models (using an unstructured covariance structure for the repeated part). Reliable change or clinically significant improvement scores were the dependent variable, and condition, phase, and the interaction between condition and phase were independent variables. When the interaction between condition and phase was not significant, the analyses were repeated without the interaction.

Note that the calculations regarding reliable change and normalization are based on the observed change in completers per phase (i.e., are not based on intention-to-treat), in line with instructions for the calculation of clinically significant improvement (Morley & Dowzer, 2014). However, in contrast to these instructions, we did not eliminate those participants who already scored high at the beginning of a phase, because we wanted to examine reliable change and clinically significant improvement also during the second phase.

3. Results

3.1. Sample characteristics

Baseline demographic and characteristics are shown in Table 1. Sixty-one percent of participants were female, 79% were low-educated, and 35% were either unemployed or received benefits from social security. All were diagnosed with MDD, and 37% had one or more additional psychiatric diagnoses. Participants reported feeling that they needed help for their current complaints since 11 months on average, indicating that their complaints were not short-lived. By chance, significantly more individuals with single episode MDD had ended up in the group starting with P-CBT, $X^2(1, N = 49) = 4.71$, $p = .03$. Other characteristics were not significantly different between the two groups. Dropout was higher in the group starting with T-CBT, $X^2(1, N = 49) = 4.75$, $p = .03$. As can be seen in the reasons for dropout in Fig. 1, relatively more participants dropped out during the T-CBT phase (the first 8 sessions), rather than at a later stage, which suggests that dropout was unrelated to unacceptability of P-CBT. Furthermore, dropouts were more likely to be female, $X^2(1, N = 49) = 7.20$, $p = .007$, unemployed or in social security, $X^2(3, N = 49) = 8,11$, $p = .044$, and marginally more likely to use psychotropic medication $X^2(1, N = 49) = 3.41$, $p = .07$. There were no other significant differences between those who dropped out and those who completed all 16 sessions with regard to baseline depressive symptoms and demographics. Importantly, our main analyses are based on intention-to-treat

Table 1
Baseline demographics and diagnostic characteristics.

Characteristics	Value [a]		
	T-CBT → P-CBT (n = 25)	P-CBT → T-CBT (n = 24)	Total (N = 49)
Age, mean (SD); [range]	40.8 (12.5); [19–61]	40.9 (14.7); [19–62]	40.8 (13.5); [19–62]
Female sex	16 (64.0%)	14 (58.3%)	30 (61.2%)
Education level (highest completed)			
Low	18 (72.0%)	19 (79.2%)	37 (78.7%)
Medium	2 (8.0%)	1 (4.2%)	3 (6.1%)
High	5 (20.0%)	4 (16.7%)	9 (18.4%)
Work situation			
Employed	13 (52.0%)	8 (33.3%)	21 (42.9%)
Unemployed	5 (20.0%)	3 (12.5%)	8 (16.3%)
Student	3 (12.0%)	3 (12.5%)	6 (12.2%)
Social Security	4 (16.0%)	10 (41.7%)	14 (18.6%)
Hours working/week, mean (SD); [range]	18.0 (19.8); [0-60]	11.7 (17.5); [0-46]	14.9 (18.8); [0-60]
Marital Status			
Married/living with partner	14 (56.0%)	10 (41.7%)	24 (49.0%)
Single/not living with partner	11 (44.0%)	14 (58.3%)	25 (51.0%)
MDD [b]			
recurrent episode	15 (60.0%)	7 (29.2%)	22 (44.9%)
single episode	10 (40.0%)	17 (70.1%)	27 (55.1%)
Combined with Dysthymic Disorder	2 (8.0%)	3 (12.5%)	5 (10.2%)
Previous individual psychotherapy [c]	20 (80.0%)	23 (96.0%)	46 (93.9%)
Months feeling that treatment is necessary, mean (SD); [range]	10.2 (8.5); [2-36]	11.9 (10.6); [0-50]	11.0 (9.5); [0-50]
Additional current psychiatric diagnoses	11 (44.0%)	7 (29.2%)	18 (36.7%)
Anxiety Disorder	9 (36.0%)	6 (25.0%)	15 (30.6%)
Somatoform Disorder	2 (8.0%)	1 (4.2%)	3 (6.1%)
Eating Disorder	0 (0.0%)	1 (4.2%)	1 (2.0%)
Impulse-Control Disorder	1 (4.0%)	0 (0.0%)	1 (2.0%)
Substance-Control Disorder	0 (0.0%)	1 (4.2%)	1 (2.0%)
Currently using psychotropic medication	15 (60.0%)	12 (50.0%)	27 (55.1%)

Note. MDD = Major Depressive Disorder.

[a] Data are presented as number (percentage) of patients unless otherwise indicated.

[b] X^2 (1, N = 49) = 4,71, $p = .03$.

[c] Given that this was a specialized care treatment unit, most patients indicated to have received previous individual psychotherapy (not necessarily related to the current episode). In many cases, this consisted of a number of sessions ($M = 3.49$, $SD = 3.59$) in less-specialized care. Content and quality of these sessions is unknown, as most patients could give only vague descriptions. Based on these descriptions, patients were unlikely to have received full-blown CBT for depression previously.

Table 2
Observed means and standard deviations at baseline and after each treatment block.

	P-CBT → T-CBT			T-CBT → P-CBT		
	Baseline (n = 24)	after 1st block (P-CBT; n = 21)	after 2nd block (T-CBT; n = 21)	Baseline (n = 25)	after 1st block (T-CBT; n = 20)	after 2nd block (P-CBT; n = 15)
QIDS-SR-16	14.29 (3.43)	7.67 (6.54)	6.71 (6.31)	14.30 (3.18)	9.9 (5.34)[a]	5.79 (5.24)[b]
RDQ total	50.67 (8.67)	35.71 (19.64)	28.19 (21.44)	53.80 (11.35)	42.90 (17.31)	24.07 (18.16)
PANAS PA	21.38 (5.23)	28.14 (8.01)	30.71 (9.37)	18.88 (4.48)	24.90 (6.49)	31.47 (8.66)
PANAS NA	31.33 (7.28)	23.71 (9.43)	20.95 (8.51)	32.96 (7.54)	25.65 (6.15)	17.53 (7.83)
LOT-R	10.08 (4.29)	12.14 (5.40)	13.33 (5.83)	9.56 (4.94)	11.15 (4.77)	14.47 (3.81)
SHS	3.03 (.79)	3.95 (1.15)	4.30 (1.23)	3.03 (.93)	3.44 (1.43)	4.52 (.96)
MHC-SF	1.63 (.84)	2.38 (1.07)	2.87 (1.21)	1.52 (.56)	2.06 (1.01)	2.85 (1.06)

Note: P-CBT → T-CBT = 8 sessions of Positive CBT followed by 8 sessions of traditional CBT. T-CBT → P-CBT = 8 sessions of traditional CBT followed by 8 sessions of Positive CBT. QIDS-SR-16 = Quick Inventory of Depressive Symptoms. RDQ = Remission from Depression Questionnaire. PANAS = Positive and Negative Affect Scale. PA = Positive Affect. NA = Negative Affect. LOT-R = Life Orientation Test-Revised. SHS = Subjective Happiness Scale. MHC-SF = Mental Health Continuum Short Form.
[a] n = 23.
[b] n = 14.

(ITT), and all available data were taken into account in the analysis until the moment of drop-out. Moreover, mixed regression has the advantage of limiting damage due to selective dropout, because it corrects for dropout as much as possible, such that dropout related to outcome levels at time points preceding dropout could not bias our results (Schafer & Graham, 2002; Verbeke & Molenberghs, 2000).

3.2. Weekly QIDS-SR-16 ratings

Observed means and standard deviations after each treatment phase are shown in Table 2. Regarding differential improvement of depressive symptoms, mixed regression analyses indicated a significant three-way interaction of time, phase and condition (see Table 3, Model 1). Fig. 3 shows the estimated means (fixed part), indicating that in the first phase the mean reduction in QIDS-SR-16 ratings was similar in the two treatments, whereas in the second phase P-CBT after T-CBT had superior effects compared to T-CBT after P-CBT. Pre-post Cohen's *d* was 1.85 for the P-CBT → T-CBT order and 2.71 for the T-CBT → P-CBT order. None of the interactions between time and episode were significant, indicating that the findings were robust for the difference between orders in single vs. recurrent episodes.

3.3. Assessments with a four-session frequency

Regarding the hypothesis that slopes of improvement differed between conditions, mixed regression analyses indicated that there were no statistically significant differences between P-CBT and T-CBT (*p* of condition x centered time interaction terms > .15 for all outcome variables). Also the condition x phase x centered time interaction terms were not statistically significant (all *p* of condition x phase x centered time interaction terms > .10; see Table 4). Pre-post effect sizes for improvement by condition and treatment order are shown in Table 5.

Regarding the question whether *averages* of measures with a four-session frequency differed by condition, mixed regression analyses indicated that PANAS NA was significantly lower during P-CBT than during T-CBT (23.0 during P-CBT vs. 25.2 during T-CBT; $F(1, 126) = 5.2$, $p = .024$, Cohen's *d* for difference between conditions = 0.3). For the other outcome measures, the effect of condition was not significant, although RDQ, PANAS PA, and LOT-R had average differences in favor of P-CBT (Cohen's *d* for differences between conditions = .27 for PANAS PA and RDQ, *d* = 0.17 for LOT-R). Repeating the analyses without the (in all cases non-significant) interaction term condition by phase did not change the results.

Table 3
Fixed effects of model testing for differential improvement of depressive symptoms by condition (P-CBT vs. T-CBT) and phase (first vs. second block pf treatment).

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	55.09	176.35	.000
LN_Time_Centered	1	140.08	39.53	.000
Phase * LN_Time_Centered	1	136.49	.61	.436
condition * LN_Time_Centered	1	164.32	7.68	.006
Phase * condition * LN_Time_Centered	1	154.61	8.23	.005

Note: Depressive symptoms were measured with Quick Inventory of Depressive Symptoms (QIDS-SR-16) after each treatment session. P-CBT = Positive CBT. T-CBT = Traditional CBT for depression. LN_Time_Centered = (natural logarithm of session number, with session numbered from 1 up to 16) – (LN(9)). Phase = first block of 8 sessions (coded as 0) or second block of 8 sessions (coded as 1). Condition = P-CBT (coded as 0) and T-CBT (coded as 1). Order referred to the different orders into which participants were randomized: P-CBT followed by T-CBT (coded as 0) or T-CBT followed by P-CBT (coded as 1).

3.4. Reliable change and clinically significant improvement

The proportion of participants showing reliable change (RC) and clinically significant improvement (RC + CSC) per condition and phase is shown in Table 6. For the first phase, this table shows the proportion of participants with improvement from baseline to session eight, for the second phase, the proportion of participants with improvement from session eight to session 16. Mixed effects logistic regression modelling indicated statistically significant differences between conditions for QIDS, RDQ, PANAS NA, and SHS, all in favor of P-CBT, see Table 6.

After receiving the combination of T-CBT and P-CBT, 72% of completers (80% for those starting with T-CBT and 67% for those starting with P-CBT) were in the 'healthy' range (i.e., scored above the PANAS PA normative population sample mean minus half a standard deviation). For the MHC, the corresponding percentages were 64% (67% for those starting with T-CBT; 62% for those starting with P-CBT), for the LOT-R 81% (80% for those starting with T-CBT; 81% for those starting with P-CBT), and for the SHS 61% (60% for those starting with T-CBT; 62% for those starting with P-CBT; SHS; Lyubomirsky & Lepper, 1999).

4. Discussion

We examined whether positive CBT (P-CBT; Bannink, 2012, 2017) represented an improvement for the treatment of MDD, compared to traditional CBT (T-CBT), at least in the short-term effects. In a randomized-order within–subject comparison, these two treatment strategies were alternated in two blocks of eight sessions in clinically depressed individuals. We tested whether improvement of depressive symptoms

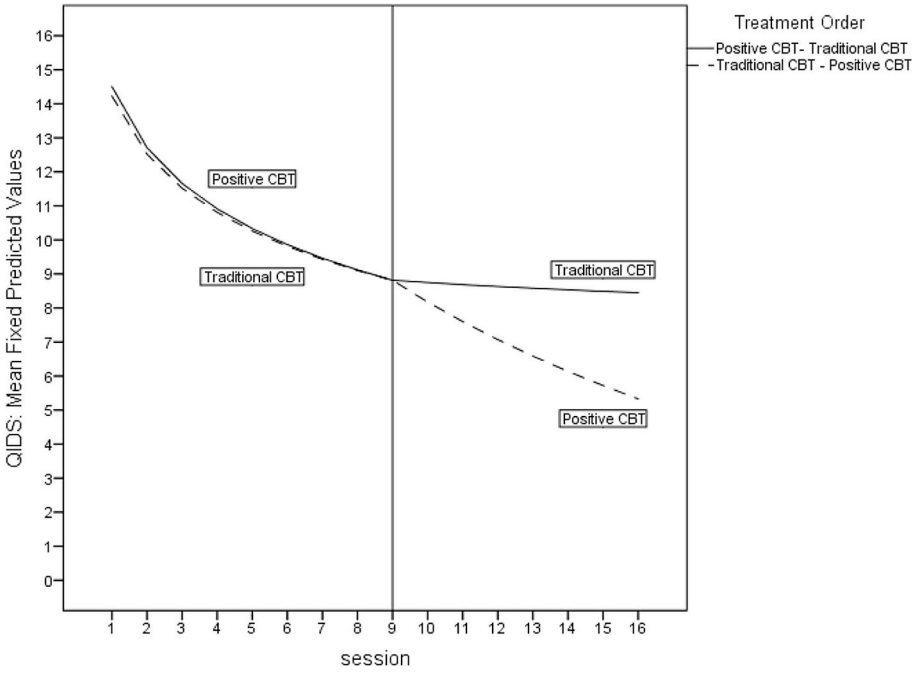

Fig. 3. Estimated course of depressive symptoms by condition and treatment phase. Values are based on the predicted values of the model testing for differential improvement of depressive symptoms depending on condition and treatment phase (fixed effect predictors of this model are shown in Table 3). Participants were randomized to different treatment orders. The switch to the other treatment condition occurred at session 9. QIDS = Quick Inventory of Depressive Symptoms (QIDS-SR-16).

Table 4
Tests of Fixed Effects from Mixed Models testing differential improvement of measures with four-session frequency.

Outcome	Condition x centered time [a]		Condition x centered time x phase [b]	
	F	*p*	*F*	*p*
RDQ	.83	.362	.93	.337
PANAS PA	.20	.657	2.16	.143
PANAS NA	1.93	.166	2.52	.114
LOT-R	1.15	.286	1.32	.256
SHS	1.88	.177	.03	.856
MHC-SF	.13	.716	.03	.869

Note: Centered time: the five measurement points numbered from 1 up to 5 were centered as (−2, −1, 0, 1, 2). RDQ = Remission from Depression Questionnaire. PANAS = Positive and Negative Affect Scale. PA = Positive Affect. NA = Negative Affect. LOT-R = Life Orientation Test-Revised. SHS = Subjective Happiness Scale. MHC-SF = Mental Health Continuum Short Form.

[a] Tests for differences in slope by condition (positive CBT versus traditional CBT for depression).

[b] Tests for differences in slope by condition depending on phase (first vs. second block of 8 sessions).

Table 5
Pre-post effect sizes for improvement by condition and treatment order.

Outcome	P-CBT → T-CBT		T-CBT → P-CBT		Across orders	
	First 8 sessions (P-CBT; n = 24	Second 8 sessions (T-CBT; n = 24)	First 8 sessions (T-CBT; n = 25)	Second 8 sessions (P-CBT; n = 25)	Change during P-CBT [a]; n = 49	Change during T-CBT [a]; n = 49
RDQ	1.19	.98	1.21	1.57	1.38	1.09
PANAS PA	1.07	.71	1.35	1.23	1.15	1.03
PANAS NA	.91	.74	0.95	1.09	1.00	.71
LOT-R	.34	.31	.37	.72	.53	.34
SHS	.86	.59	.57	.97	.91	.58
MHC-SF	.84	.84	.80	.97	.90	.82

Note: Conventional effect sizes in terms of Cohen's d were estimated based on the mixed regression's fixed effects for the numerator, and the SD of the overall sample at baseline for the denominator. RDQ = Remission from Depression Questionnaire. PANAS = Positive and Negative Affect Scale. PA = Positive Affect. NA = Negative Affect. LOT-R = Life Orientation Test-Revised. SHS = Subjective Happiness Scale. MHC-SF = Mental Health Continuum Short Form.

[a] Effect sizes for condition (Positive CBT versus traditional CBT) were averaged across both orders.

[b] Effect sizes for order reflect the improvement from pre to post treatment. P-CBT → T-CBT = 8 sessions of Positive CBT followed by 8 sessions of traditional CBT. T-CBT → P-CBT = 8 sessions of traditional CBT followed by 8 sessions of Positive CBT.

and negative affect differed in P-CBT compared to T-CBT, and whether P-CBT would be accompanied by greater improvements in positive affect and other indices of positive mental health (optimism, subjective happiness).

Results of intention-to-treat mixed model analyses on depressive symptoms (based on the Quick Inventory of Depressive Symptoms [QIDS], our primary outcome measure) unexpectedly indicated a differential effect depending on the phase of treatment, with equal improvement in depressive symptoms during the first block of 8 sessions, and a significantly stronger improvement in P-CBT compared to T-CBT when provided during the second block of eight sessions. Effect sizes for the effect of overall treatment on reduction of depressive symptoms were large, especially given that the sample was largely treatment-resistant (most participants received antidepressant medication and had received prior treatment): for participants who received T-CBT followed by P-CBT, pre-post Cohen's d was 2.71, for participants who received P-CBT followed by T-CBT, Cohen's d was 1.85.

Across all other outcome measures (depression as measured with the Remission from Depression Questionnaire, Positive and Negative Affect [PANAS], optimism [LOT-R], happiness [Subjective Happiness Scale], and mental health [Mental Health continuum]), rate of improvement between conditions was not statistically different, also not for the other depression measure [RDQ] when measured once every 4 sessions. One reason for the statistical non-significance may be a loss of power due to the reduced measurement frequency, especially given the significant phase by treatment interaction which we found for our weekly depression measure. In order to reduce participant burden, these other measures could only be administered at pre-treatment baseline and after every fourth session. On average, negative affect was significantly lower during P-CBT than during T-CBT, while average differences for the other outcomes were in favor of P-CBT but not statistically significant.

Table 6
Per phase and per condition, proportion of patients in completer sample showing reliable change (RC) and clinically significant improvement (RC + CSC).

	Index	P-CBT– > T-CBT		T-CBT– > P-CBT		Condition x Phase		Condition		Phase	
		1st phase (P-CBT)	2nd phase (T-CBT)	1st phase (T-CBT)	2nd phase (P-CBT)	F(1,70)[a]	*p*	F(1,71)[b]	*p*	F(1,71)[b]	*p*
QIDS	RC	14/21	3/21	9/16	9/14	3.361	.061	**6.553**	**.013**	3.141	.081
	RC + CSC	12/21	3/21	6/16	8/14	1.523	.221	**5.514**	**.022**	.868	.355
RDQ	RC	15/21	13/21	11/17	12/15	.312	.579	1.178	.281	.058	.811
	RC + CSC	10/21	10/21	3/17	11/15	.036	.850	**8.872**	**.004**	**8.838**	**.004**
PANAS PA	RC	11/21	7/21	8/17	10/15	1.289	.260	2.872	.094	.000	.995
	RC + CSC	11/21	7/21	8/17	10/15	1.289	.260	2.872	.094	.000	.995
PANAS NA	RC	12/21	4/21	6/17	8/15	.478	.492	**5.369**	**.023**	.749	.390
	RC + CSC	8/21	4/21	2/17	7/15	.035	.853	**4.457**	**.038**	.460	.500
LOT-R	RC	3/21	3/21	1/17	2/15	.416	.521	.300	.586	.279	.599
	RC + CSC	3/21	3/21	1/17	2/15	.416	.521	.300	.586	.279	.599
SHS	RC	13/21	6/21	5/17	7/15	.338	.563	**4.259**	**.043**	.385	.537
	RC + CSC	9/21	4/21	4/17	4/15	.166	.685	1.645	.204	.908	.344
MHC-SF	RC	8/21	8/21	6/17	7/15	.171	.681	.473	.494	.071	.791
	RC + CSC	7/21	7/21	6/17	4/15	.055	.815	.183	.670	.182	.671

Note: RC = Reliable change. RC + CSC = Reliable and clinically significant improvement. QIDS-SR-16 = Quick Inventory of Depressive Symptoms. QRDQ = Remission from Depression Questionnaire. PANAS = Positive and Negative Affect Scale. PA = Positive Affect. NA = Negative Affect. LOT-R = Life Orientation Test-Revised. SHS = Subjective Happiness Scale. MHC-SF = Mental Health Continuum Short Form. *F* and *p*-values obtained through mixed effects logistic regression modelling, with values for condition and phase reported for model without interaction between condition and phase, given the non-significant interactions.

[a] $F(1,68)$ for QIDS.

[b] $F(1,69)$ for QIDS.

Extra mixed effects logistic regression modelling (performed upon reviewer request) indicated that P-CBT was associated with significantly higher rates of clinically significant improvement for depression and negative affect, and higher rates of reliable change for subjective happiness, compared to T-CBT. The superiority of P-CBT over T-CBT in stimulating clinically significant change on these outcomes was independent of phase. Overall pre-post improvement effect sizes were large also for the measurements with four-session frequency, especially for the combination of T-CBT followed by P-CBT (depression, positive affect, and negative affect: $d > 2.0$; subjective happiness and mental health: $d > 1.2$; optimism $d > 1.0$).

The unexpected finding that P-CBT and T-CBT did not differ with regard to our primary outcome measure depressive symptoms during the first phase may suggest that the treatment form does not matter during the initial phase of treatment. On the other hand, dropout was significantly lower for participants starting with P-CBT (with most of the dropout occurring during the first phase for participants starting with T-CBT). This differential dropout introduces the possibility of bias, with the direction of this bias depending on how one interprets the reason for dropout: If dropout were unrelated to the treatment condition, T-CBT may potentially be seen as more potent than P-CBT (i.e., achieving the same clinical effect with fewer sessions delivered). On the other hand, mixed regression corrects for variables related to dropout in its prediction, thereby preventing bias related to selective dropout (Verbeke & Molenberghs, 2000). Also, qualitative interviews with a subset of participants indicated that many perceived T-CBT as “emotionally heavy and unpleasant” (see also Barnes et al., 2013; Kahlon, Neal, & Patterson, 2014), and that the majority had a preference for P-CBT (Geschwind, n.d.). These reactions suggest that higher drop-out may be related to T-CBT specifically, though whether struggling with T-CBT really did cause the higher dropout rates remains speculative. The additionally requested analyses on clinically significant improvement, although not a priori, further support the notion that P-CBT was superior rather than less potent: much of the clinically significant change took place during the first eight sessions, especially during P-CBT, and P-CBT outperformed T-CBT (independent of treatment phase) on depression as measured with both QIDS and RDQ. Overall, these findings indirectly support the acceptability and effectiveness of this novel treatment as a stand-alone treatment. However, given that this trial was designed as a within-subject treatment and was not powered to detect between-subject changes between treatments, we could not statistically analyze this further.

Trying to compare our effect sizes with information from previous clinical trials, it becomes clear that CBT trials report on indices of positive affect or positive mental health only infrequently. We identified only a couple of T-CBT studies reporting on the PANAS. Our effect sizes are larger than effect sizes reported for CBT in a mixed sample of self-referred participants with depression and anxiety problems after about 12 sessions (PANAS positive affect: $d = 0.86$; negative affect: $d = 0.98$; Saxon, Henriksson, Kvarnström, & Hiltunen, 2017), 16 sessions CBT for depression and anxiety (PANAS positive affect: no change; Kring, Persons, & Thomas, 2007), and weekly telephone-administered CBT during 16 weeks for patients with depression and multiple sclerosis (PANAS positive affect: $d = 1.1$; Mohr et al., 2005). Although statistically not significant and in need of further, better powered replication, these comparisons suggest that P-CBT contributed to improving positive affect to a larger degree than previous CBT trials.

Furthermore, despite the fact that many of the participants struggled with unemployment or other ongoing psychosocial issues, many of the positive mental health indices were comparable to norm scores after treatment. Regarding positive affect, our sample initially scored lower than 90% of participants from Crawford and Henry's normative population study (Crawford & Henry, 2004). After receiving the combination of T-CBT and P-CBT, participants' positive affect was around the 50th percentile, with 72% of completers at post-measure scoring higher than the normative population sample mean minus half a standard deviation (PANAS; Crawford et al., 2009; Crawford & Henry, 2004). On average, Mental Health Continuum scores after treatment were comparable to Dutch norm scores, with 64% of completers at post-measure scoring higher than the normative population sample mean minus half a standard deviation (MHC; Lamers, 2011). Optimism (LOT-R) scores were comparable to norm scores reported by Scheier and colleagues (1994), with 81% of completers at post-measure scoring higher than the normative population sample mean minus half a standard deviation. Subjective happiness scores (SHS) approached the average scores reported by Lyubomirsky and Lepper (1999), with 61% of completers at post-measure scoring higher than the normative population sample mean minus half a standard deviation.

Taken together, the normative population comparisons as well as the relatively larger effect sizes found in our study compared to T-CBT-

only studies suggest that the augmentation of T-CBT with P-CBT shifts the effects of treatment towards an increase in positive mental health (in line with patients' view of successful remission from depression), rather than merely a decrease in depressive symptomatology (Demyttenaere et al., 2015; Zimmerman et al., 2006). Our findings are in line with the Undoing hypothesis (Fredrickson, Mancuso, Branigan, & Tugade, 2000) as well as with other literature emphasizing the importance of explicitly focusing on positive emotions in the treatment of depression (Craske et al., 2016; Dunn, 2012; Geschwind et al., 2011). Relatively more clinically significant change occurred during treatment with P-CBT rather than T-CBT, and depressive symptoms improved significantly more during P-CBT than during T-CBT in the second phase of treatment. This suggests that focusing on the patient's preferred future, better moments, solutions, and competences increases positive affect as well as undoes negative affect, and efficiently counters depressive symptoms.

4.1. Clinical implications

Note that, although P-CBT is meant as a stand-alone treatment, we do not have a strong basis for providing recommendations based on the first eight sessions only. However, the observation that a large proportion of clinically significant improvement occurred already after eight sessions of P-CBT, and that improvements covered positive mental health as well as depressive symptoms indices, suggest that P-CBT is an efficient treatment for major depressive disorder. Moreover, P-CBT stimulated clinically significant or reliable change of depressive symptoms, negative affect, and subjective happiness to a larger degree than T-CBT.

The finding that the effect sizes were relatively larger for T-CBT followed by P-CBT than for P-CBT followed by T-CBT suggests that if clinicians wanted to combine both approaches in a structured sequence, it would be advisable to start with T-CBT and then progress with P-CBT (although rigorously separating these techniques may be less necessary in clinical practice than in a research trial). Patients seemed to find it more difficult to switch from P-CBT to T-CBT than from T-CBT to P-CBT, and reported a clear preference for P-CBT in a qualitative sub-study to this trial. In the qualitative sub-study, participants also indicated that they preferred switching from T-CBT to P-CBT, rather than the other way round (Geschwind, Bosgraaf, Bannink, & Peeters, n.d.). Possibly, patients starting with P-CBT would have benefitted more from continuing with P-CBT, rather than switching to T-CBT. Alternatively, 8 sessions of T-CBT may be seen as too short to derive full benefits, and continuing on a 16 session T-CBT course could theoretically have led to equal outcomes as when switching to P-CBT.

The large effect sizes found especially for the combination of T-CBT followed by P-CBT suggest that CBT for depression may benefit from solution-focused brief therapy and positive psychology exercises. This trial cannot answer the question to what extent each of these two components contributed to improvement during treatment. Clinical observation during the trial suggests that a) therapists reported often not doing a positive psychology exercise due to lack of time, and b) patients frequently did not complete homework positive psychology exercises. Together with the relatively small effect sizes usually found for positive psychology interventions (PPI's, see introduction for effect sizes), this seems to suggest that the art of steering patients towards positive elements through solution-focused language was essential. Alternatively, embedding PPIs in a positive CBT framework may strengthen their effect substantially. More systematic investigation of the relative contribution of these two components is necessary before arriving at conclusions.

Our findings also imply that using a more upbeat tone (rather than empathically mirroring the somber tone of depression) as well as opening subsequent sessions with the question “What is better?” (a question which the therapists initially dreaded because they thought patients may perceive it as inappropriate) is not only acceptable (based on our not yet published qualitative study; Geschwind et al., n.d.) but also beneficial for the reduction of depressive symptoms.

4.2. Strengths and limitations

To our knowledge, this is the first study to compare positive CBT to traditional CBT for major depressive disorder. Importantly, the traditional CBT protocol included cognitive as well as behavioral activation components. Strengths of the current study furthermore include the use of a (moderately to severely and predominantly treatment-resistant) clinically depressed and actively help seeking sample in a community mental health care setting, thereby enhancing external validity. Moreover, mixed method analysis uses all available measurement points and corrects for dropout based on the predictors in the model, thereby producing accurate predictions on an intention-to-treat basis.

Limitations of the study include the following: First, power to detect within-subject differences between measures which were taken only every four sessions was relatively lower, compared to the weekly assessed depressive symptoms measure. Consequently, the lack of significant differences with regards to rates of improvement on the secondary outcomes is hard to interpret, and comparisons of treatments during the first treatment phase only are not possible. Also, the crossover design may have led to unintentional (and immeasurable) carryover effects. Second, although the design used in this study has the advantage of relatively high power for the within-subject comparison of treatments, power to detect between-subject effects is low. This design therefore does not enable conclusions on how the therapies compare when provided as single treatment, let alone how their long-term effects compare. Third, fidelity checks were unfortunately not possible given budget constraints and the fact that fidelity measures have not yet been developed for P-CBT. However, threats to treatment fidelity (and ways to preserve fidelity) were frequently discussed during supervision. Qualitative interviews with a subset of clients suggested that clients sometimes ‘secretly’ carried on with positive CBT homework (Geschwind et al., n.d.), and therapists reported on some clients' reluctance to engage in a focus on problems once they adapted to a focus on better moments. Fourth, DSM-IV rather than DSM-5 was used, given that this was still the practice at the mental health care institution during data collection. Fifth, therapists were new to P-CBT and often insecure about applying it, and relatively more experienced with T-CBT. On the other hand, therapists received supervision by the developer of P-CBT (Bannink) but not T-CBT (although the institution, education, and prior working experience of therapists was strongly influenced by T-CBT). Sixth, the possibility of allegiance biases to P-CBT needs to be addressed, given that the first author, a researcher with a strong interest in positive emotions, worked at the clinical institution at the time of the trial and was one of the five trial therapists. On the other hand, also the first author had no prior experience with P-CBT at the start of the trial and does not benefit in any way from an advantage of P-CBT over T-CBT. Also, the first author was assigned to the two starting orders approximately equally often. Inspection of the data suggested that treatment by the first author (compared to the other therapists) was related to less drop-out, but we saw no evidence for differential improvement in either P-CBT or T-CBT depending on the therapist. Moreover, the second author, who has a stronger allegiance with T-CBT rather than P-CBT, was responsible for the statistical analysis and correct interpretation of the data.

4.3. Recommendations for future research

Future research is needed which compares P-CBT with T-CBT, preferably in a full-blown RCT. Also, research could investigate whether mechanisms of improvement are different for patients receiving P-CBT, compared to T-CBT. Better powered studies could also follow up on the suggestion emerging from our data that the order of T-CBT followed by P-CBT is especially beneficial: An RCT could compare whether T-CBT

amplified with P-CBT has better effects than T-CBT or P-CBT alone. Investigating follow-up and relapse-prevention effects of P-CBT is also necessary (especially given the often recurrent nature of depression). Additionally, research is needed to identify to which degree solution-focused brief therapy versus positive psychology exercises represent effective and essential components of P-CBT. Finally, research may evaluate the usefulness of positive CBT for treating other disorders related to stress and anxiety.

Declaration of interests

Fredrike Bannink receives royalties for publications on positive CBT, and payment for teaching positive CBT workshops.

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